Zoology in the new millennium

Newspapers and TV shows have been reflecting on the past and contemplating the future as the new millennium takes over. In the 1930s, zoologists such as Ellis Troughton (Troughton 1932) considered the past, present and future of our fauna. Modern zoologists do not seem to be so reflective, at least not in print, although there are some outstanding exceptions as may be evident from the pages of the *Australian Zoologist* over many years. Typical of our editorial efforts over the last decade, this edition of the *Australian Zoologist* extends Troughton's tradition in being both reflective and forward-looking. Jim Noble peers into the past with speculation on the traces of extinct fauna remaining on the landscape; John Ling considers two centuries of commercial trade in fur seals and sea lions; Glenn Shea sheds new light on the zoological attributes of a well-known lizard; Meri Oakwood and Paul Hopwood challenge contemporary society by considering the option of house-quolls as house pets and the pressing issues of mammal conservation are covered by Sandy Pollock's investigation of the current status of the poorly known Northern Quoll. Most papers in this edition are reflective, each is zoological to its core, and each contains embedded within it the current paradigms of zoological thinking. This edition, along with the past editions in the 1990s, and all the books and transactions of the RZS, reflect the full range of contemporary zoological thought and expertise. Collectively, these publications condense a decade of zoological effort that symbolizes the state of the discipline at the end of the second millennium. So, what is the current state of the science, and what can we predict of its future?

AN ISSUES-BASED JOURNAL

As editors, we listen to comments by colleagues who read the *Australian Zoologist*. One, a distinguished researcher, thought that there was not much "hard" zoology in the journal while another thought that it took an issues-based approach. "Hard" zoology we take to mean rigorously tested hypothesis-driven research, while the term "issues-based" we take to mean the application of zoological thinking to contemporary fauna conservation concerns. We agree with both comments, with the proviso that an issues-based focus is necessary given the current state of our fauna and that "hard" zoology is but yesterday's issues-based zoology that has become a foundation stone of a major line of zoological thinking.

The zoology of an earlier era largely consisted of description without the testing of ideas. Such descriptions generated views on cause and effect, but untested conjecture was sometimes misleading. What was required, be it in the discipline of physiology or ecology, was hypotheses that could be tested, experiments that could be repeated, and replication that yielded numerical values with standard errors. When experimental design came of age, it became invaluable to zoological researchers and gave zoological thinking the measurable framework for testing new ideas. Although the postulating of hypotheses had the appearance of fashion when the methods were being developed, it has now become a benchmark for acceptable zoological science. We agree with those concerned with the rigorous application of scientific method and analysis that it has not penetrated as far into some disciplines as it should. The environmental consultancy industry, particularly, seems to skirt around it, often arguing that EISs are management and planning documents and not supposed to be "hard" science. The untested conjectures which characterize so many planning and management documents are unacceptable if we are seriously concerned about predicting the long-term future of our fauna. Many managers and planners are unwilling to submit their ideas to rigorous evaluation, believing their role to be different from experimental science. In our view it is not.

The RZS has as its twin objectives the promotion of the science of zoology and the conservation of our fauna. It would be bizarre if one were conducted with more rigour than the other. So, the issue we are concerned with is to acknowledge the importance of experimental design and use it to conserve our native fauna. Thus we encourage the submission of "hard" zoology to the journal, and such papers are refereed by experts in the field. Those authors whose papers do not meet the standards are advised accordingly. However, it would be inappropriate to apply experimental design to some of the topics that appear in the *Australian Zoologist*, especially when they appear expressly for the purpose of stimulating debate and generating new ideas which may in turn be taken up for experimental design. We are consciously contributing to a paradigm shift that is helping to expand the zoological horizon for the next millennium, while at the same time consolidating the gains of earlier issues-based struggles for better zoological practice.

SEALING THEIR FATE

John Ling has produced a remarkable tale of the fate of our fur seals and sea lions and has expanded knowledge of these Australian marine mammals. One can deduce many lessons from Ling's account. Some will draw the conclusion implied by the above subtitle, namely that an exploitative sealing industry did irreparable damage to our fur seal and sea lion populations. The principles of ecologically sustainable development, which were not current last century, let alone the 1790s when commercial sealing flourished, now provide a conceptual benchmark for the conservation of species and their life support systems, such as trees and soils.

Ling applies a new methodological approach by combing historical records for zoological information. This is a growing discipline which some call ecological history because it applies historical research tools to answering ecological questions. Historical research has been used in pursuit of modern zoological inquiry by examining whatever data sets exist, such as those to be found in old newspapers or shipping records. It is now not possible to conduct harvesting experiments on seals since they are no longer present in sufficient numbers and the social and political mood is against it. However, it is of more than curiosity value to know, if possible, about fur seal and sea lion numbers and distribution at the beginning of European settlement of Australia. The historical viewpoint allows us to see how some species have responded to drastic change. It provides insight into why species that collapsed in numbers did not go extinct, and yet did not recover when intense harvesting abated. If we had only recent knowledge and relied solely on experimental design to tell us about the numbers, distribution and the response of fauna to change, we would be in weaker position to assess proposed conservation actions and prepare recovery plans. However, such plans or assessments, including EISs or species management plans, also need the rigour imposed by experimental research. Taken together, these methods serve fauna conservation better by drawing on as broad a range of intellectual endeavour as we can muster.

One of us (DL) heard John Ling present an outline of what became his paper at the 1997 AGM of the Mammal Society held in John's home patch of Clare, South Australia. John was asked if he intended to publish the account. He thought he ought to, but could not see where it might go. Naturally, the *Australian Zoologist* was suggested. He said he would think about it. Much later, John called and wanted more information. He said the paper would be very long, and that the tables were essential. Previous experience had shown that such historical accounts are generally extensive as copious evidence from disparate sources is collected and slowly pieced together. We agreed to publish it, and here is the result after a careful process of refereeing by relevant experts. Such experts know the sealing ships by name, know much about the science of fur seals and sea lions, and can quickly assess whether scholarship in this area is sound, and whether the interpretations are correct.

John Ling has had a long and distinguished career as a marine mammal zoologist, then director of the South Australian Museum. Yet, if the Mammal Society had not gone to Clare, and if John had not used his retirement productively (from a zoological standpoint), and if ecological history had not begun to gain some scientific respectability, John might have consigned his insights to oblivion in an abstract given to an AGM. From an editorial viewpoint it seemed that this excellent paper was unlikely to see the light of day in printed form if left to the decision of the author to submit. John Ling's reluctance to publish was no doubt influenced by the paradigm of "hard" science and we are pleased he has agreed to publish here. It is our view that such proactive editing is helping to establish the issues of the new millennium and then harden the zoology in it.

THE SYMBOLISM OF ECOLOGICAL HISTORY

In the 212 years since European settlement there have been dramatic changes in the discipline of zoology as well as the survival prospects of Australian fauna. However, there are plenty of signs, particularly in marine resources, that the lessons of the sealing industry have not been learnt. Ecological history is a forward-thinking discipline that looks back for its data. The forward-looking component is a growing interest in seeing Australia over a longer time frame. We can now picture the zoology of Australia in 1788, but it is much harder to imagine what it will be like in 2212. There is a symbolic shift represented in looking at our zoological history. We are keen to secure a better future for our fauna, but how to achieve that is not easily answered. We can be surer of some things than others, and one of the things we are more certain of is that a rich zoological future will need to be grounded in sound zoological science. The more imaginative it is in conception, the more rigorous it is in its execution and the more demanding it is in publication the better our chances will be of conserving and restoring our faunal heritage.

Being at the cutting edge requires a sharpness as well as a hardness: sharp with the issues and hard on minimum standards of scholarship and zoological accuracy. The interdisciplinary subject of ecological history will require the researcher either to be a zoologist or work with a zoologist. There is a bright future for this emerging discipline, but it will require more boldness on the part of the authors, editors, funding bodies and employers to see the significance of this line of research. Some ecological historians feel like those sealers, mentioned by Ling, left on the sub-Antarctic islands when the seal market collapsed in London in 1809. A line of such research takes years, and one can be half way through a task when funding disappears because the political market requires a different zoological product. Nonetheless, like those seals which survived, ecological historians will persist as it becomes increasingly clear that such multi-disciplinary research will gain respect in the next millennium for the unique contribution it can make to the study and conservation of fauna.

REFERENCES

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